C4ISR in the Stryker Brigade Combat Teams

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What makes the SBCT unique is its combination of enhanced information technology and communications, which increases force effectiveness and agility through a command- and execution-centric approach to decisionmaking.

— SBCT Organization & Operations[1]

INFORMATION superiority derives from a mastery of information as an element of combat power. It involves gaining a more complete situational understanding than our adversary and translating this information into an ability to "see first, understand first, act first, and finish decisively."

Information superiority is dynamic and relies on proactive, thinking leaders who maximize all available information while trusting and empowering their subordinates. It also depends on the emerging technologies and processes embodied in a robust command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) information structure.

In U.S. Army Field Manual (FM) 3-0, *Operations*, information superiority is described as "the operational advantage derived from the ability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same."[2]

The Army strives to give commanders the ability to gain information superiority. As described in Joint Vision 2020 and reinforced in multiple Army documents, including the Army White Paper for the Objective Force, information superiority is critical to battlefield success.[3] It gives the commander an edge to develop the situation out of contact and have the right force at the right place, at the right time, to maintain momentum and keep the enemy off balance.[4]

Today, Army forces are modernizing information systems to achieve information superiority. This provides leaders at multiple levels with real and near-real time information and more complete and timely situational awareness. This dramatic investment was assessed during the JRTC-based Advanced Warfighting Experiment and in development of Force XXI units at Fort Hood, Texas. The Stryker Brigade Combat Teams (SBCT) at Fort Lewis, Washington make up a combined-arms organization designed to achieve and maintain information superiority using an embedded C4ISR capability.

In a recent paper for the Association of the U.S. Army's (AUSA) Institute of Landwarfare Symposium, Major General James Dubik noted that the SBCTs and the evolving interim force would give the Army a "Twofer."[5] First, the Army would get full-spectrum, combat-ready units that were prepared for immediate deployment and could fight on arrival. Second, the Army would get an active, experienced-based learning laboratory from which to gain insights that would be applied to shaping the emerging Objective Force. Can the Interim Force, the current SBCTs and their progeny, give commanders what they need to gain information superiority? Is the Army on the right track to achieve the conditions for true and continual information superiority within the Interim Force as a gateway to the Objective Force?

The SBCT is a new and unique organization, and there is a great deal of literature about its capabilities. Infantry-centric, it includes an entirely new unit, the reconnaissance, surveillance, and target acquisition (RSTA) squadron. The SBCT relies on a robust, embedded C4ISR capability, which runs vertically and horizontally throughout the unit and contains the unit's external links and provides the properly integrated commander with the means to gain information superiority.

The SBCT Tactical Infosphere

The C4ISR capability is not merely limited to equipment. It includes consideration of the flow of information and how leaders use that information. Information gatherers include human intelligence

(HUMINT) sources such as soldiers and civilians on the battlefield. The information environment and supporting C4ISR within the SBCT can be described in terms of the SBCT infosphere (see figure). In general, the SBCT infosphere includes all assets that contribute to the flow and processing of information within and to the SBCT. It should not be limited to the SBCT proper but can include a database accessible through reachback. Structurally, the infosphere can be broken into five interconnected subsystems and their enabling processes:

- *Information transport.* This is the backbone that carries information, includes assets within the SBCT, and reaches out for information beyond the SBCT.
- *Digital battle command.* Currently dominated by the Army Battle Command System (ABCS), digital battle command includes the systems that facilitate information management, collaborative planning, and assist in maintaining situational awareness.
- *Intelligence, surveillance, and reconnaissance* (ISR). More than just sensors, ISR includes the process for collecting, analyzing, and disseminating ISR information and intelligence.
- *Combat service support* (CSS) *information systems.* The ability to anticipate logistics requirements is enhanced by CSS information systems, which form a thread within the infosphere and are a key element in the unit's ability to sustain itself in distributed operations.
- *Command posts* (CPs). CPs serve as the command and control (C2) synchronization node and are the points where other subsystems come together.

Current Assessment

The Army has only now fielded its first two SBCTs, and there are not enough planned training events to test the full employment of the C4ISR and completely evaluate the commanders' ability to gain information superiority. Still, parts of the C4-ISR have been used in various exercises, including a highly successful brigade warfighter exercise in September 2001 and Millennium Challenge in August 2002. Also, it is possible to estimate expected performance using data from the joint contingency force advanced warfighting experiments and from the 4th Infantry Division's Division Capstone Exercises (DCX) I and II. (SBCT was a player unit in DCX II.)

Information transport. The current SBCT information transport subsystem can be further subdivided into several components: digital tactical Internets (TIs); FM voice; high frequency (HF) long-range communications; and satellite communications. In terms of what is new, the presence of a well-developed TI and satellite communications at brigade level and below are unique to the SBCT.

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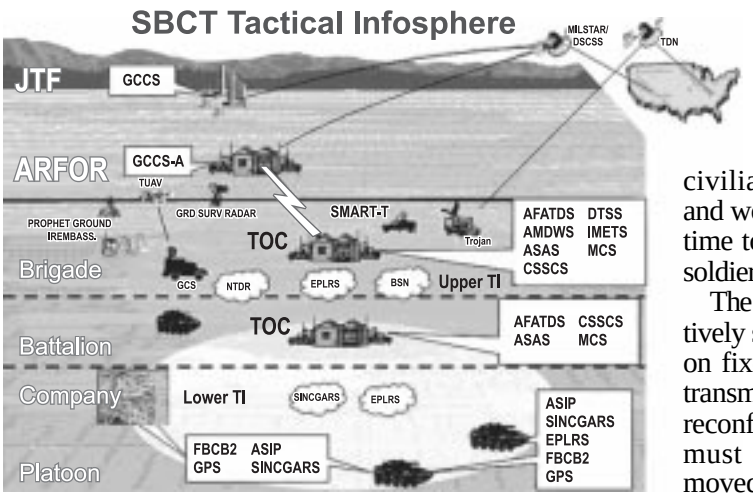
For terrestrial digital communications, the SBCT incorporates a TI that consists of the low-bandwidth Enhanced Position Locating Radio System (EPLRS) and the Near Term Digital Radio (NTDR). The EPLRS provides primary digital communications for battalion and below. The NTDR has more bandwidth and forms the backbone of the upper TI, providing communications from battalion to brigade.

The TI is admittedly immature at this stage, and the SBCT has not had many opportunities to employ it. Maintenance and troubleshooting challenges are expected from DCX I, where much of the same technology was employed. The TI is extremely brittle and difficult to diagnose. Small problems can cause large disconnects. Experience at Fort Lewis has shown that the TI requires a high degree of expertise to ensure proper maintenance. This expertise is normally only available with civilian contractors and would take some time to develop with soldiers in the field.



The network is relatively static and relies on fixed relay or retransmission sites. To reconfigure, the sites must be physically moved. This method

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Soldiers retrieving information in a SBCT tactical operations center, 28 February 2003.

Current digital CPs are a step forward from their analog predecessors. Their modular design allows CPs to conduct a variety of operations. Also, both the RSTA squadron and field artillery battalion CPs can integrate into the SBCT main CP if the situation dictates. This CP configuration centralizes ISR and lethal and nonlethal effects-targeting efforts.

contrasts with emerging Unit of Action concepts that envision an infostructure that moves with the unit. In the SBCT, units will move in and out of a fairly set network.

Bandwidth dramatically affects information management. The relatively small bandwidth capacity of both the upper and lower TIs forces the unit to make hard choices of when and how to send information. Sending a large file, such as a graphic-heavy operations order or intelligence update, will clog the network. Since there is no dynamic bandwidth allocation, the digital pipes are filled on a first-come, first-served basis. Managing the system to send the right information at the right time and in the right size will require clear, unambiguous procedures and ruthless discipline.

Long-haul satellite information transport outside the SBCT is provided by the proven, yet bandwidth stingy, TROJAN SPIRIT. The SBCT has not experienced an opportunity to fully employ this system, but TROJAN SPIRIT is employed throughout the Army and is not expected to have a different application with the SBCT.

A second satellite system for intratheater communications is the Secure Mobile Antijam Reliable Tactical Terminal, or SMART-T. HMMWV-mounted like TROJAN SPIRIT, this is a HF, unattended terminal that was used effectively during DCX II. Though typically found at division and above, the SMART-T allows the SBCT to exercise greater dispersion while maintaining secure communications. However, using any satellite-based system requires scheduling satellite time and establishing techniques and protocols to work with the digital gateway, such as the TROJAN SPIRIT Gateway at Fort Belvoir, Virginia, or the military satellites supporting SMART-T.

The SBCT's use of organic satellite communications has exceptional and direct application to facilitating information superiority. If allocated and leveraged properly, the SBCT commander can have real-time and near-real-time access to worldwide intelligence.

Digital battle command. The SBCT incorporates a full suite of ABCS systems to acquire situational awareness and facilitate command and control (C2). With Force XXI Battle Command Battalion/Brigade and Below (FBCB2) at platform level and battlefield operating systems at battalion and above, the SBCT can establish and share a common operating picture (COP) working from a joint common database (JCDB).

The SBCT is keeping pace with ABCS development, but it is clear that there are currently some challenges as ABCS matures. ABCS is developing into a "system of systems" from essentially stovepipe systems. Seamless interoperability is promoted but not currently assured. With rapid changes in software, the systems require intensive training for operators and leaders and normally necessitate a great deal of contractor support during training exercises. Experience shows that to use digital battle command technologies effectively, units need well thought-out and well-drilled information management methods (nested in digital standard operating procedures [SOPs]).

The SBCT has several tools that enable some degree of collaborative and parallel planning, horizontally and vertically. Possessing limited battlefield VTC at brigade level, the brigade relies on NetMeeting-like capabilities for horizontal and vertical collaboration. Unfortunately, the relatively high-bandwidth requirement makes fully using these capabilities impractical without excluding all other traffic in the network.

Intelligence, surveillance, and reconnaissance. Within the realm of ISR, the number of sen-

sors and information gatherers available to the SBCT is impressive and includes organic unmanned aerial vehicles (UAV) and access to national assets via TROJAN SPIRIT.

Integrating existing ISR assets into the SBCT is successful and great strides are being made as the unit employs its assets and develops supporting tactics, techniques, and procedures (TTP). However, some system challenges exist. The majority of ISR systems were in stovepipe development before the creation of the SBCT. Typically, there is minimal digital interface between each system, and they generally work alone. What is needed is a centralized asset collection and processing system. This would make analysis more efficient and aid dissemination. The emerging distributed common ground system-Army (DCGS-A) should integrate these various sensor grids.

Current challenges also involve establishing TTP for unity of effort in managing ISR assets, collection, analysis, and dissemination. The ISR effort is borne by RSTA, brigade S2, military intelligence (MI) company, and infantry battalions; orchestration of these requires forethought, training, and clear SOPs.

The SBCT has significant HUMINT assets that are critical in urban operations. They are drawn from the Reserve Component (RC). Unfortunately, no procedures exist to conduct habitual training with these units. Also, there is concern about the training, readiness, and ability to integrate the nonorganic HUMINT teams into the SBCT.

CSS information systems. A streamlined SBCT with reduced footprint requires planners to anticipate logistics requirements. Systems that permit total asset visibility and management, rapid identification of requirements, and a precise flow of logistics minimize waste and excess inventory.

The logistics community at Fort Lewis, Washington, is using an assortment of digital systems to analyze the logistics flow from the end-user backward through the continental United States (CONUS)-based depot to the supplier; however, a requirement that these systems work together has hampered its analysis. The evolving global combat service support proposes a more complete and centralized logistics view. Yet, its development is uncertain. Units must work with what they have.

CSS digital systems are unable to use the digital information transport system described earlier. Although Warfighting Information Network-Tactical (WIN-T) promised multilevel security, current policies and practices prohibit transfer of sensitive but unclassified data, which makes up much of the logistics data over the SECRET TI. Costly high-assurance guards allow SBU data to pass over the SECRET TI, but no dedicated digital network for logistics data exists.

Command posts. The current SBCT command post structure is a series of integrated HMMWVs with modular Standardized Integrated Command Post Structure shelters. CPs provide a place for an internal, hardwire, local-area network that facilitates collaboration, while hosting a variety of C4ISR equipment that includes ABCS.

Current digital CPs are a step forward from their analog predecessors. Their modular design allows CPs to conduct a variety of operations. Also, RSTA squadron and field artillery battalion CPs can integrate into the SBCT main CP if the situation dictates. This CP configuration centralizes the ISR and the lethal and nonlethal effects-targeting efforts.

The combat information center (CIC) is an innovative feature within the CPs that facilitates parallel and collaborative planning. A knowledge center, the CIC, is a series of plasma screens that display multiple, centralized inputs from DBC or various sensors. With key staff and commanders either physically or virtually interfacing through the CIC, the SBCT has improved its collaborative and parallel planning.

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Satellite acquisition with a SMART-T is demonstrated to members of the 369th Signal Battalion, 18 February 2003.

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The SBCT's CPs include the tactical, main, and rear CPs. With intratheater communications (SMART-T) and Trojan Spirit connectivity, the CPs can maintain maximum dispersion to minimize the footprint in areas requiring extensive force protection.

TRADOC is aggressively reviewing CP doctrine. Though deployable and mobile, the extensive C4ISR packages and supporting infrastructure make vehicle transportability a major concern. The power generation system originally fielded to the unit was based around the auxiliary power units fielded with the rigid-wall shelters, as well as selected 10 kilowatt towed and skid-mounted generators. This resulted in a power-generation system that was unbalanced, inconsistent, difficult to manage, and hazardous because of noise and noxious fumes. Recent modifications incorporate centralized power plants that provide balanced power and actually minimize the CP's signature.

The CP, especially the main CP, is susceptible to electromagnetic interference from radio frequency emitters. This is notably acute in the main CP. Grounding and dispersion reduces their impact. Leaders must consider these effects when establishing the CP and then adjust.

Many CP issues center on the C4ISR-intensive command version of the Stryker. Stryker command vehicles will undergo many of the same challenges as the CPs themselves.

The Future

Fortunately, the Fort Lewis program has ties throughout the Army to make C4ISR a process for attaining information superiority. To ensure that C4ISR stays on the correct path, several procedures should be followed. First and foremost, there must be a clear, active, authoritative proponent for C4ISR that ensures that C4ISR development is tied to the operational concepts it supports. This cannot be a single branch such as signal intelligence or MI, since C4ISR permeates the entire combined arms team. Within TRADOC, the Combined Arms Center (CAC) at Fort Leavenworth, Kansas, was recently named as the overall proponent; however, all Army schools must actively participate. CAC must develop and sustain a vision for C4ISR that is applicable vertically and horizontally across the battlespace.

As Interim Forces work with the available C4ISR suites and serve as experiential laboratories, the Army must apply the lessons to Objective Force development. It involves a firm linkage between the Objective Force C4ISR development community and the Interim Force.

The Interim Force must train to fight using existing C4ISR systems and concepts; however, emerging doctrine and TTPs are based on a nonexistent Objective Force capability. The unit, then, is left to improvise "work arounds" and highly perishable short-term solutions. The Army needs to be fluid enough to recognize that C4ISR development is dynamic and not necessarily linear. Doctrine and TTP should correspond to these Interim Force systems so that soldiers can fight using what they have now.

Current materiel developmental business practices that rely on rigidly developed operational requirement documents cannot keep pace with dynamic requirements and developments. Current system development and procurement processes do not promote the seamlessness needed in such complex multisystems as command posts. Consequently, CPs suffer from the "pick-up team" syndrome symptomatic of a collection of loosely affiliated systems.

In the past, units going to the field brought radios, tentage, and other components to make the CP work. The Army is moving away from the era, however, when intuitive knowledge alone ensures that all systems fit neatly together. Today, CPs require a high degree of integration that is not available in most units.

Coupled with the heavy TRADOC and materiel developer on-site presence, I Corps and the SBCTs at Fort Lewis are raising the emerging Interim Forces' understanding of C4ISR and its use in assisting the commander to gain information superiority. The entire community is integrating imperfect systems in various stages of development, including the development of sound TTP that maximize system capability.

The magnitude of the effort will require a clear, firm vision to realize C4ISR's potential. This might involve some reorganization and reengineering of how the Army does business. It also must be done in concert with the sister services. Without a doubt, though, the Army is on the right track toward achieving information superiority and providing commanders with the needed tools to get the right force to the right place at the right time. ***MR***

NOTES

1. *SBCT Organization & Operations (O&O)*, chap. 4 (publishing information unknown).
2. U.S. Army Field Manual (FM) 3-0, *Operations* (Washington, DC: U.S. Government Printing Office, 14 June 2001), 11-2.
3. U.S. Army White Paper, "Concepts for the Objective Force" (publishing information unknown).
4. Ibid., 10.
5. James M. Dubik, "The Army's 'Twofer': The Dual Role of the Interim Force," The Institute of Land Warfare, AUSA (October 2001).

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